Research Proposal of the Thesis entitled

To check the prevalence rate of pre term birth deliveries and low birth weight babies associated with maternal periodontitis in Charpokhari block of Bhojpur district, Bihar

Submitted By

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Introduction:

The state of an individual's oral health, specifically their teeth and gums, is an important indicator of that individual's general health and well-being. This correlation is becoming more widely understood at a quick rate. These infections are called "periodontal disease." However, anaerobic Gram-negative bacilli appear to play an important role in the disease's pathogenesis despite the fact that no obvious pathogen has been found. The innate immune system of the human body is activated in reaction to the presence of gram-negative bacteria, and immune cells then begin to secrete inflammatory mediators. Cytokines, prostaglandins, and matrix metalloproteinases are three factors that play an especially significant role in periodontal disease. This is one of the hypotheses that underpins the theory. Oral bacteria have been shown to be capable of moving to the uterus in pregnant women through a process known as haematogenous transmission, which has been studied both in people and animals. Because of the unique circumstances of the patients involved in this research, dental radiographs were not taken at any point. (Andonova et al., 2015)

Preterm (PT) birth is a big delinquent that causes a lot of death and illness, both short-term and long-term, in mothers and babies. The average time for a person to be pregnant is 40 weeks. Most of the time, a birth before 37 weeks is called "PT" or "premature." Most babies born early also have LBW, which means they weigh less than 2500 grams at birth. Pre term labor, or PTL, is when the cervix changes and there are contractions that need medical help. Women who are pregnant and have mild to severe periodontitis are more likely to have babies who are born early and have a LBW.

The biologically plausible function of periodontal infections leading to adverse pregnancy outcomes must be explained to pregnant women. Two of the many proven risk factors, cigarette smoking and alcohol consumption, are under the individual's control. Increasing evidence links symptomatic non-genital maternal infections to early labor, membrane rupture, and delivery. In 50% of premature rupture of membranes and early delivery cases, maternal infection and inflammation are the major reasons, according to epidemiologic, molecular, microbiologic, obstetric, animal model, and experimental investigations. At least ninety-eight percent of the 3 million stillbirths worldwide occur in low- and middle-income nations. About two-thirds of

these stillbirths occur before labor, during pregnancy. Risk factors and obstetric treatment quality may affect prenatal and intrapartum stillbirths in low- and middle-income countries. Premature stillbirths are induced by uterine damage and demonstrate maceration.

Due of the enormous epithelial area in periodontal pockets, low-grade may develop systemic sores. The recent decade has seen major advances in molecular, statistical, and biological methodologies. These advancements have helped researchers understand complex human illnesses caused by several factors.

First way of spreading is temporary bacteremia transmits sickness from the mouth to other regions of the body. Second is metastatic harm from circulating oral microbial toxins including lipopolysaccharide during development and produces several clinical symptoms when introduced into the host. Other way is oral microorganism-induced immunological damage and metastatic inflammation. Microorganisms might potentially enter the amniotic fluid and fetus via the vagina, cervix, and choriodecidual sac during pregnancy, an infected endometrium before pregnancy, or the bloodstream. Periodontal disease may target the amnion or indirectly impair PLBW via inflammatory substances.

Premature infants are experiencing health complications. Majority of neurological morbidity and mortality in children is caused by PT birth. PT delivery affects an estimated 11% of pregnancies, and this number seems to be on the rise in developed countries. Though PLBW neonatal survival rates have increased over the past two decades, these babies are still at a much higher risk of passing away in the first few weeks of life.

As a result, researchers in the Charpokhari region of Bhojpur, Bihar, set out to determine the prevalence of PT births and LBW infants and relationship between these factors.

Review of Literature

1. Offenbacher S. et. al., 1996, Periodontal diseases have been determined to be Gram-negative anaerobic infections that can affect women of childbearing age. (18 to 34 years). They wanted to ascertain whether the prevalence of maternal periodontal infection was associated with PTLBW while controlling for known risk factors and potential confounding variables. These findings suggest that periodontal disease is a previously unrecognized and

clinically significant risk factor for PTLBW resulting from either PT delivery or preterm PROM. (Steven Offenbacher, 1996)

2. Dasanayake A. in 1998 found out necessitates an ongoing search for modifiable risk factors for LBW prevention. Risk was greater among mothers who received no or delayed prenatal care (OR = 3.9, 95% CI: 1.25 - 12.2) We conclude that poor maternal periodontal health is a possible independent case control for LBW.(Ananda P. Dasanayake, 1998)

3. Mitchell-Lewis et. al., 2001 examined those disparities in clinical periodontal status between women with PT birth and women with a normal birth outcome. However, PLBW mothers had substantially elevated levels of Bacteroides forsythus and Campylobacter rectus, as well as consistently elevated counts of the other examined species. PLBW occurred in 18.9% of women who did not receive periodontal therapy (17 cases) and in 13.5% of those who did receive therapy (10 cases).(Mitchell-Lewis et al., 2001)

4. Nurcan Buduneli et. al., 2005 evaluated that PT delivery of LBW is still a big public health issue and a leading cause of infant death and long-term health problems. There were no statistically significant differences in the dental and periodontal parameters between the cases and the controls, and the values of the clinical periodontal recordings were found to be very identical. More research is needed to figure out if there is a link between periodontal illnesses and PLBW.(Buduneli et al., 2005)

5. Santos-Pereira SA et. al.,2006 looked into CP and premature birth in a group of Brazilian women who were pregnant and living in the state of Sao Paulo. In a group of pregnant women from Brazil, CP has a strong link to PTL, PTB, and LBW. These numbers show that CP needs to be looked into regularly during pregnancy. (Santos-Pereira et al., 2007)

6. Khader Y. et. al., 2009 figured out the spread of MP and PTLBW among women in the north of Jordan. The intensity and number of periodontal diseases seemed to be linked to a higher chance of PLBW birth. Still, before it can be fully understood that periodontal

infection is a real risk factor for PLBW, more and bigger intervention trials need to be done.(Khader et al., 2009)

7. Nicolino Calabrese et. Al., 2010 predicted the link between PD and LBW babies born early. (LBW). 11% of all women gave birth to kids who were too small. Ten women (9%) delivered PTLBW kids. No link was found between either of the two meanings of PD and any of the bad things that can happen during pregnancy.(Calabrese et al., 2010)

8. T.B. Taiyeb Ali and K. Zainal Abidin, 2012 looked at how the oral health of pregnant women in Malaysia affected how their babies turned out. Prospective cohort study with a convenient group of people of different races. The mean Plaque Index was the only predictor that was significant (P0.03). In this group of people who took part in the study, PD was not found to be a risk factor for PT delivery or LBW baby. The only thing that was linked to PT births and LBW babies was the mean Plaque Index.(Taiyeb Ali, 2012)

9. Ahmad Haerian-Ardakani et. al. in 2013 looked at the periodontal health of women during puerperium and tried to figure out if there was a link between their gum disease and giving birth to babies with LBW. Among the known risk factors for LBW kids, the fact that the case mothers had a previous LBW baby was statistically significant (p=0.0081, Student t-test). The gums of mothers of LBW babies were less healthy (p=0.042) and they had deeper pockets (p=0.0006, Mann-Whitney test). Periodontal disease in the mother can be a risk factor for LBW on its own.(Haerian-Ardakani et al., 2013)

10. Mallika Sethi Dua et. al.,2014 examined that PLBW is a big medical, social, and economic problem that causes a lot of maternal and especially newborn death, acute illness, and long-term effects. There are many reasons to believe that PLBW and gingivitis are linked. Based on the idea that an infection causes a chain of inflammatory reactions that are linked to both PT labor and periodontal disease, a model is suggested to explain the relationship. There are signs that oral intervention studies to control periodontal disease could be one way to stop women from going into labor too early. This paper talks about the topic of periodontal disease and bad pregnancy outcomes.(Mallika Sethi Dua et al., 2014)

11. Teshome A et. al., 2016 explained that PD is an infection caused by bacteria that is often ignored and destroys the gums in pregnant women. The research examined premature delivery, LBW/PTLBW, and periodontitis. Periodontal disease was not associated with PT birth, LBW, or PT birth with LBW in only one study. Periodontal disease can induce early birth and LBW. (Teshome & Yitayeh, 2016)

12. Hongyu Ren and Minquan Du , 2017 figured out that In the last 20 years, a lot of research has been done to see if periodontitis is a risk factor for early birth. (PTB). However, epidemiological studies and interventions have reached diverse conclusions. Severe and/or extensive periodontitis increases the risk of PTB, but only in young, HIV-positive, preeclamptic, overweight, or gene-predisposed pregnant women.(Ren & Du, 2017)

13. Jajoo N. et. al., 2020 estimated that a woman's ability to get pregnant relies on how well her immune system works. During pregnancy, changes in the bacteria that make up the subgingival tooth plaque biofilm cause a more dangerous and harmful microbial community to grow.(Jajoo et al., 2020)

Need/ Significance of the study

To check the Prevalence rate of Pre term birth deliveries and **l**ow birth weight babies associated with Maternal Periodontitis in Charpokhari block of Bhojpur district, Bihar

Objectives of the study

1. To determine the prevalence of PT babies among the mothers with periodontitis.
2. To determine the prevalence LBW babies among the mothers with periodontitis.
3. To compare the prevalence of total delivery with normal deliveries associated with MP.
4. To compare the prevalence of total delivery with PT deliveries associated with MP.

5. To compare the prevalence of total delivery with LBW babies associated with MP.
6. To compare the prevalence of total delivery with PT babies and LBW babies associated with MP.
7. To compare the prevalence of total delivery with PT babies and LBW babies associated without MP.

Hypothesis (if any)

1. There is either differences or no any differences in the prevalence data correlated of total delivery with PT deliveries associated with MP.
2. There is either differences or no any differences in the prevalence data correlated of total delivery with LBW babies associated with MP.
3. There is either differences or no any differences in the prevalence data correlated of total delivery with PT babies and LBW babies associated with MP.

Research Methodology

The study population of 3600 pregnant mothers from January, 2020 to December, 2021 who delivered singleton babies in PHC centre at Charpokhari, Bihar.

Inclusion Criteria:

- Age limit of 25 to 40 years Pregnant females.
- Medical history will obtain through oral interview:
  Maternal Age, Socio Economical Status, Birth Weight of The Baby, Parity, Infection,

Complications During Pregnancy, Intra-Uterine Growth Retardation (Iugr), Preterm Premature Rapture of The Membranes (Pprom), Maternal Haemorrhage and Onset of Labor.

- Pregnant Mother Who Was Admitted Within One or Two Days Prior To Deliveries will be selected in the study after their consent obtained.

Exclusion Criteria:

- Mothers suffering from any congenital abnormalities or systemic illness like chronic medication-requiring medical disorders, Systemic illnesses include HIV infection, Hypertension/ hypotension, uncontrolled Hyperglycaemia/ hypoglycaemia.
- Exclude those lacking teeth in one or more sextants.

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Ethical conformation:

The confidentiality of the participants will be maintained and the information didn't disclose to anyone.

Participant will be allowed to leave this study anytime.

Sponsors for the study:

No fund/sponsorship will be taken from any company/firm/institutions.

Source of Funds:

The principal investigator will do this research by himself.

Instrument and supplies:

The following instruments and supplies in sufficient number were used:

1. Mouth mirrors

2. Community periodontal index (CPI) probe

3. Tweezers

4. Trays for Diagnostic Instruments

5. Examination Gloves and Face masks

6. Cotton rolls

Details of examination:

Principal investigator performed the whole clinical evaluation of all participant's mother at PHC center of Charpokhari, Bihar. To reduce examiner variability, the investigator had been calibrated prior to performing the survey.

A clinical exam A trained and calibrated lead investigator assessed all women for periodontal problems in their hospital rooms one to two days after birth. The investigator was blinded to the baby's physical state to reduce prejudice.

- Pocket depth probing
- Bleeding on probing
- Calculus with plaque deposits

- Gingival recession assessed using modified Community Periodontal Index CPI criteria.

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CPI probe (Hv-Friedy, Chicago, IL, USA) used to measure pocket probing depth in mm from gingival edge to pocket bottom and gingival recession at six locations per tooth. In case of absence of index tooth, adjacent tooth was checked according to guidelines of WHO.

The baby's mothers divided into three groups by chance:

Group 1: PT babies among the mothers with periodontitis

Group 2: LBW babies among the mothers with periodontitis

Group 3: PT babies among the mothers with periodontitis + LBW babies among the mothers with periodontitis.

Scope and Limitation of the study

The results expected are as follows:

Periodontitis is strongly linked to PTLBW babies in animal and human studies. Thus, dentists diagnose and treat this illness early, preventing pregnancy complications in susceptible mothers.

Expecting that PT deliveries and LBW babies' prevalence will be higher and its association with MP in Charpokhari block of Bhojpur district, Bihar will be established.

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